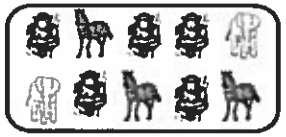
3.2 The student will

a) name and write fractions and mixed numbers represented by a model;
b) represent fractions and mixed numbers, with models and symbols; and
c) compare fractions having like and unlike denominators, using words and symbols (>, <, =, or ≠), with models.

Understanding the Standard

- When working with fractions, the whole must be defined.
- A fraction is a numerical way of representing part of a whole region (i.e., an area model), part of a group (as in a set model), or part of a length (i.e., a measurement model).
- Proper fractions, improper fractions, and mixed numbers are terms often used to describe fractions. A proper fraction is a fraction whose numerator is less than the denominator. An improper fraction is a fraction whose numerator is equal to or greater than the denominator (e.g., $\frac{3}{2}$). An improper fraction may be expressed as a mixed number. A mixed number is written with two parts: a whole number and a proper fraction (e.g., $1\frac{1}{2}$).
- The value of a fraction is dependent on both the number of equivalent parts in a whole (denominator) and the number of those parts being considered (numerator).
- A fractional part of a whole can be modeled using
  - region/area models (e.g., pie pieces, pattern blocks, geoboards, drawings);
  - set models (e.g., chips, counters, cubes, drawings); and
  - length/measurement models (e.g., rods, connecting cubes, number lines, rulers, and drawings).
- In each area/region model, the whole is divided or partitioned into parts with area of equivalent value. The fractional parts are not always congruent and could have a different shape as shown in the examples:

- In the set model, each member of the set is an equivalent part of the set. In set models, the whole needs to be defined, but members of the set may have different sizes and shapes. For instance, if a whole is defined as a set of 10 animals, the animals within the set may be different. For example, students should be able to identify monkeys as representing half of the animals in the set shown:



Essential Knowledge and Skills

The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to

- Name and write fractions (proper and improper) and mixed numbers with denominators of 12 or less in symbols represented by concrete and/or pictorial models. (a)
- Represent a given fraction (proper or improper) and mixed numbers, using concrete or pictorial set, area/region, length/measurement models and symbols. (b)
- Identify a fraction represented by a model as the sum of unit fractions. (b)
- Using a model of a fraction greater than one, count the fractional parts to name and write it as an improper fraction and as a mixed number (e.g., $\frac{1}{4}, \frac{2}{4}, \frac{3}{4}, \frac{4}{4}, \frac{5}{4} = 1\frac{1}{4}$, or $2\frac{1}{3} = \frac{7}{3}$). (b)
- Compare a model of a fraction, less than or equal to one, to the benchmarks of 0, $\frac{1}{2}$, and 1. (c)
- Compare proper fractions using the terms *greater than, less than, equal to, or not equal to* and the symbols (<, >, =, and ≠). Comparisons are made between fractions with both like and unlike denominators, with concrete or pictorial models. (c)

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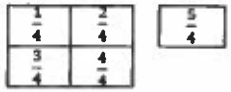
Understanding the Standard	Essential Knowledge and Skills
• In the primary grades, students may benefit from experiences with sets that are comprised of congruent figures (e.g., 12 eggs in a carton) before working with sets that have noncongruent parts. • Students need opportunities to use models to count fractional parts that go beyond a whole. For instance, if students are counting five slices of cake and building the cake as they count, where each slice is equivalent to one-fourth, they might say "one-fourth, two-fourths, three-fourths, four-fourths, five-fourths." As a result of building the whole while they are counting, they begin to realize that four-fourths make one whole and the fifth-fourth starts another whole, and they begin to develop flexibility in naming this amount in different ways (e.g., five-fourths or one and one-fourth). They will begin to generalize that when the numerator and the denominator are the same, there is one whole and when the numerator is larger than the denominator, there is more than one whole. They also will begin to see a fraction as the sum of unit fractions (e.g., three-fourths contains three one-fourths or four-fourths contains four one-fourths which is equal to one whole). This provides students with a visual, as in the example below, for when one whole is reached and develops a greater understanding of numerator and denominator.  $\frac{5}{4}=\frac{1}{4}+\frac{1}{4}+\frac{1}{4}+\frac{1}{4}+\frac{1}{4}$ and $\frac{5}{4}=1\frac{1}{4}$ • Models, benchmarks, and equivalent forms are helpful in judging the size of fractions. • Experiences at this level should include exploring and reasoning about comparing and ordering fractions with common numerators, common denominators, or comparing to the benchmarks of $\frac{1}{2}$ and 1. • Students should have a variety of experiences focusing on comparing: – fractions with like denominators; – fractions with like numerators; – fractions that are more than one whole and less than one whole; and – fractions close to zero, close to one-half, and close to one whole.	

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Understanding the Standard	Essential Knowledge and Skills
• Comparing unit fractions (a fraction in which the numerator is one) builds a mental image of fractions and the understanding that as the number of pieces of a whole increases, the size of one single piece decreases (e.g., $\frac{1}{5}$ of a bar is smaller than $\frac{1}{4}$ of the same bar). • Comparing fractions to a benchmark on a number line (e.g., close to 0, less than $\frac{1}{2}$, exactly $\frac{1}{2}$, greater than $\frac{1}{2}$, or close to 1) facilitates the comparison of fractions when using concrete materials or pictorial models. • Provide opportunities to make connections among fraction representations by connecting concrete or pictorial representations with oral language and symbolic representations. • Informal, integrated experiences with fractions at this level will help students develop a foundation for deeper learning at later grades. Understanding the language of fractions (e.g., *thirds* means "three equal parts of a whole," $\frac{1}{3}$ represents one of three equal-size parts when a pizza is shared among three students, or *three-fourths* means "three of four equal parts of a whole") furthers this development.	